The general results show decrease in the amount of digestion of starch by the fungus in the presence of low concentrations (M/10,000 and M/100,000) of the chlorides and sulphates. The view is taken that the decreased digestion is caused by decreased secretion of diastase rather than by inhibition of the activity of secreted diastase. Potassium salts decrease secretion more than corresponding sodium salts. Experiments with nutrient solutions instead of single salts showed the same general effect, decreased secretion. No evidence was found to support the idea that calcium or potassium is intimately related to diastase formation. On the other hand, nitrogen may possibly have some relation to enzyme formation. Nitrates added singly increase the actual amount of starch digestion, but since the mycelial growth is much increased, there is really less digestion per unit of dry weight of mycelium.—C. A. SHULL.

Reaction of the medium and nitrogen assimilating organisms.—FRED and DAVENPORT[17] have studied the relation of the legume bacteria and *Azobacter* to low concentrations of acids and alkalies. When sulphuric acid was added to the nutrient solutions, the following hydrogen ion concentrations were found to be critical for the various legume organisms: alfalfa and sweet clover, P_H 4.9; garden pea, field pea, and vetch, P_H 4.7; red clover and common beans, P_H 4.2; soy beans and velvet beans, P_H 3.3; lupines, P_H 3.15. The authors believe a correlation exists between the acid resistance of the bacteria and the acid resistance of the higher plant with which they are associated. These organisms are not injured by normal alkali additions to the culture medium until the addition is about 10 times that of sulphuric acid producing injury. There seems to be little difference in the several strains as to the alkali resistance.

Azobacter is limited to a much narrower range of reaction than are the legume organisms, the critical limits being 6.5 P_H for acid and 8.6 P_H for alkali. It is to be regretted that the reaction was not determined by the gas chain as well as by the colorimetric method.—WM. CROCKER.

Transpiration.—DUGGAR and BONNS[18] have issued a third paper from the Missouri Botanical Garden on the effect of a film of Bordeaux mixture and other films on the transpiration of leaves. In potted mesophytes such a film increases generally the transpiration at night, but has less or no effect during the day. Similar behavior is shown by excised leaves. In *Cyperus esculentus*, a plant of xerophytic surface modification, such films have no effect on transpiration rate. The writers offer as tentative the following explanation: the film of Bordeaux mixture on the surface of a plant in a state of guttation acts more or less as a bibulous surface, taking water directly from the interior of the plant, through at least some continuous water channels

[17] FRED, E. B., and DAVENPORT, AUDREY, Influence of reaction on nitrogen-assimilating bacteria. Jour. Agric. Research **14**:317–336. 1918.

[18] DUGGAR, B. M., and BONNS, W. W., The effect of Bordeaux mixture on the rate of transpiration. Ann. Mo. Bot. Gard. **5**:153–176. 1918.

established by means of the open water-suffused stomata. This would account for the effectiveness of the film at night and for its lack of effectiveness with *Cyperus* with its very narrow stomata. The authors state that there are difficulties in the incipient guttation explanation as applied to excised leaves.—WM. CROCKER.

Turgor movements.—BLACKMAN and PAINE,[19] by use of a special conductivity cell, have studied the conductivity of the liquid extruded from the lower half of the excised pulvinus of *Mimosa pudica* due to the shock stimulus. The shock response gives an increase in conductivity, but not nearly enough to attribute the contraction to increased extrusion of solutes. They believe, therefore, that the contraction is due to a sudden condensation of solutes within the pulvinal cells of the lower half of the pulvinus. They consider the conductivity method far superior to the plasmolytic method used by previous authors, for it answers directly the amount of movement of solutes. Under certain conditions they get autonomic movements of this organ similar to those of the leaflets of *Desmodium gyrans*. A slow rise of temperature up to 50° C. shows little increase in exosmose of electrolytes from this organ. The increase of permeability at higher temperatures seems to be due to lethal irreversible changes.—WM. CROCKER.

Alternation of generations in Padina.—*Padina variegata*, one of the Dictyotaceae, is abundant at Beaufort, North Carolina, where it has been studied by WOLFE.[20] Sperms, eggs, and tetraspores are borne on 3 separate plants which look alike in the vegetative condition, but which are easily recognized during reproduction. Tetraspores give rise to only male and female plants in approximately equal numbers, so that sex is probably predetermined during the reduction division in the tetraspore mother cell. Fertilized eggs produce only tetrasporic plants, so that there is an alternation of sporophyte and gametophyte generations. Eggs often germinate without fertilization, but plants of such parthenogenetic origin do not mature. It would be interesting to know the chromosome numbers, especially in the parthenogenetic plants, and we hope that WOLFE, who is familiar with the cytological technique of the algae, will investigate this phase of the problem.—C. J. CHAMBERLAIN.

The luminous moss.—TODA[21] has made a physiological study of *Schistostega osmundacea*, the so-called luminous moss, his material having been obtained from a cave in Japan. He found the optimum intensity of light as well as the minimum and maximum intensities in terms of Bunsen's unit. In a dark place

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[19] BLACKMAN, V. H., and PAINE, S. G., Studies in the permeability of the pulvinus of *Mimosa pudica*. Ann. Botany **32**:69–85. 1918.

[20] WOLFE, J. J., Alternation and parthenogenesis in *Padina*. Jour. Elisha Mitchell Scientific Soc. **34**:78–109. 1918.

[21] TODA, VISCOUNT YASUMOCHI, Physiological studies on *Schistostega osmundacea* (Dicks) Mohr. Jour. Coll. Sci. Tokyo **40**:no. 5. pp. 30. *pls.* 2. 1918.